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ABSTRACT

An annual study, mandated by the Texas State Legislature, was done of research expenditures at Texas public institutions of higher education for the fiscal year 1990-1991. The year's report contains, for the first time, data on intellectual property patents, copyrights, and licensing agreements. Findings indicate the following: (1) total research expenditures increased 11.3 percent over fiscal year 1990, continuing a long-term growth trend with expenditures increasing by 10.1 percent at public universities and by 13.5 percent at public health institutions; (2) among public academic institutions, Texas A&M (Agricultural and Mechanical) University reported the most research expenditures and, among public health institutions, M. D. Anderson Cancer Center reported the most research expenditures; (3) the Federal Government provided 48.8 percent of research funds and continued to provide the largest amount of research support; (4) institutions of higher education reported that 73 percent of their research is basic research (as opposed to applied research); (5) research expenditures in some areas of special interst were: cancer ($132,751,024), biotechnology ($52,655,724), energy ($49,159,724), food/fiber/agricultural products ($43,570,091), and aerospace technology ($20,992,651); (6) the top 10 research institutions together account for more than 90.4 percent of all research expenditures in the state; and (7) institutions received $3,159,293 from royalties, licensing, or other transactions related to intellectual property. (Author/JB)

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ED345607

Research Expenditures

Texas Public Institutions of Higher Education

September 1, 1990 - August 31, 1991

Division of Research, Planning, and Finance
Texas Higher Education Coordinating Board
P.O. Box 12788
Austin, TX 78711-2788

March 1992

HE 025 507

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The Texas Higher Education Coordinating Board was created by the Texas Legislature in 1965. It is charged with the responsibility to achieve "excellence for college education" for the people of Texas through the unified development of the Texas system of higher education; efficient and effective use of all resources; elimination of costly duplication in program offerings, facilities, and physical plants; and advocacy for adequate resources for the institutions to realize their full potential to educate.

The Board consists of 18 members from across the state, appointed by the governor with the advice and consent of the Senate for six-year terms.

Executive Summary

This research expenditures report is based on data provided by each institution for fiscal year 1991 -- Sept. 1, 1990, through August 31, 1991. Highlights include:

- Total research expenditures increased 11.3 percent over fiscal year 1990. Total research expenditures in fiscal year 1990 were $861,364,534, and research expenditures in fiscal year 1991 were $958,951,589.

- Among public academic institutions, Texas A&M University (including Texas A&M Services) reported the most research expenditures -- $243,866,262. Among public health institutions, M.D. Anderson Cancer Center reported the most research expenditures -- $108,988,715.

- The federal government provided 48.8 percent of research expenditures and continues to be the largest source of research funds.

- Institutions of higher education reported that 73 percent of their research is basic as opposed to applied research.

- Research expenditures in some areas of special interest include the following: Cancer -- $132,751,024; Biotechnology -- $52,655,724; Energy -- $49,159,724; Food, Fiber, Agricultural Products -- $43,570,091; Aerospace Technology -- $20,992,651.

- The top 10 research institutions together account for more than 90.4 percent of all research expenditures in the state.

- Institutions received $3,159,293 from royalties, licensing, or other transactions related to intellectual property resulting from research.

This year's report includes answers to a series of questions about institutions' "Intellectual Properties Agreements".

Overview

The Texas Higher Education Coordinating Board's annual research expenditures report summarizes data submitted to the Board under Section 61.051(h) of the Texas Higher Education Code, which includes this statement:

> "Once a year, on dates prescribed by the board, each institution of higher education shall report to the board all research conducted at that institution during the last preceding year."

While the Coordinating Board attempts to ensure that data are consistent and accurately transcribed for its annual research expenditures report, the agency cannot verify the accuracy of the data provided by the institutions. Institutions are asked to ensure that the data reported under this provision are consistent with data in their Annual Financial Reports, and a set of definitions are provided to help ensure consistency from institution to institution. Even with these safeguards, institutions have some latitude in determining how they report data.

The Coordinating Board's summary research report is based on expenditures, which more accurately reflect the level of current research activity than the amount of research awards. Awards tend to fluctuate from year to year, making them a much less stable indicator for year-to-year comparisons.

This year's report contains data on intellectual property patents, copyrights, and licensing agreements -- information not included in previous reports.

Data elements and definitions used in this year's report are comparable to similar research expenditure data elements used by the National Science Foundation (NSF). The two sets of elements differ to some degree because the NSF focuses on science and technology alone, while the Coordinating Board report includes research in all disciplines.

Collection of research expenditure data is a challenging task for institutions. For that reason, information they have submitted and the Coordinating Board's research expenditures report should be considered indicative rather than definitive. Administrators face many difficulties as they sort out research expenditures at their institutions. Much research funding is the result of a combination of peer review and negotiation with sponsors rather than one or the other; many research projects include some basic and some applied research; and many research projects are multidisciplinary and have implications for many different areas.

Earlier editions of this annual report are available from the Texas Higher Education Coordinating Board, Educational Data Center, P.O. Box 12788, Austin, Texas 78711-2788.

This year's edition marks the 25th in the series.

Major Findings

Total research expenditures at Texas public institutions of higher education increased by 11.3 percent during fiscal year 1991, continuing a long-term growth trend. Expenditures increased by 10.1 percent at public universities and by 13.5 percent at public health institutions.

As in most states, research expenditures in Texas higher education were concentrated in a relatively small number of institutions. Collectively, the top five institutions in research spending accounted for 74 percent of total research expenditures. The top 10 institutions accounted for more than 90 percent of the total.

Texas health-related institutions have very strong research programs. Five of them ranked among the top 10 institutions in research expenditures.

Table 1

Institutions	FY 1990 Rank	FY 1991 Rank
Texas A&M University	1	1
UT at Austin	2	2
UT M.D. Anderson Cancer Center	3	3
UT Southwestern Medical Center	4	4
UTHSC at Houston	5	5
UTHSC at San Antonio	6	6
University of Houston	8	7
UTMB at Galveston	7	8
Texas Tech University	9	9
UT at Arlington	12	10
University of North Texas	10	11

The federal government provided 48.8 percent of all research expenditures by Texas public institutions of higher education, making it the source of most research funds -- as it is in other states. At doctorate-granting institutions nationwide, a National Science Foundation study reported that 60.8 percent of research was funded by the federal government as recently as fiscal year 1989.

State government in Texas provided 24 percent of all research expenditures in public higher education. According to the NSF study of fiscal year 1989, 8.3 percent of research spending by doctorate-granting universities nationwide was funded by state and local governments.

The ratio of federal funds to state-appropriated funds for each of the 10 Texas institutions reporting the greatest research expenditures is provided in Table 2.

Table 2

Institutions	Rank Total Expenditures	Ratio Federal/State Expenditures	Rank Ratio
Texas A&M University	1	1.15	7
UT at Austin	2	4.10	5
UT M.D. Anderson Cancer Center	3	0.58	9
UT Southwestern Medical Center	4	9.19	2
UTHSC at Houston	5	5.01	3
UTHSC at San Antonio	6	10.41	1
University of Houston	8	2.00	6
UTMB at Galveston	7	3.59	4
Texas Tech University	9	0.82	8
UT at Arlington	10	0.50	10

Medical sciences, accounting for 31.1 percent of the total, led all other disciplines in expenditures. The top five disciplines -- medical sciences, engineering, biological and other life sciences, physical sciences, and environmental sciences -- collectively accounted for 85.3 percent of all reported research expenditures.

Despite pressures to move into more applied research, support of basic research totaled 73 percent of their research expenditures.

Institutions reported that 62.4 percent of their research expenditures resulted from peer-reviewed competitive selection processes.

Institutions earned $3,159,293 from royalties, licenses, and other transactions involving intellectual property produced through research. Institutions' intellectual property policies also produced 213 patents or copyrights.

Statewide Summary Data

Expenditures related to research are divided into two categories: expenditures for the conduct of research and development, and other sponsored activities. The other activities category refers to support received from external sources to fund activities that cannot be considered strictly research. Examples include grants for equipment or facilities, contracts to do studies, and training examples. Definitions for both categories are included on the data collection form published in Appendix A.

Table 3 and Figures 1 - 4 provide information on expenditures and sources of funds for the conduct of research and development on for other sponsored activities related to research.

Table 3

Expenditures of Research Funds			
	Conduct of R & D	Other Sponsored Programs	Total
Public Universities	$ 598,438,209	$ 64,002,345	$ 662,440,554
Public Health Institutions	360,513,380	50,181,032	410,694,412
Totals	$ 958,951,589	$ 114,183,377	$ 1,073,134,966

Figure 1

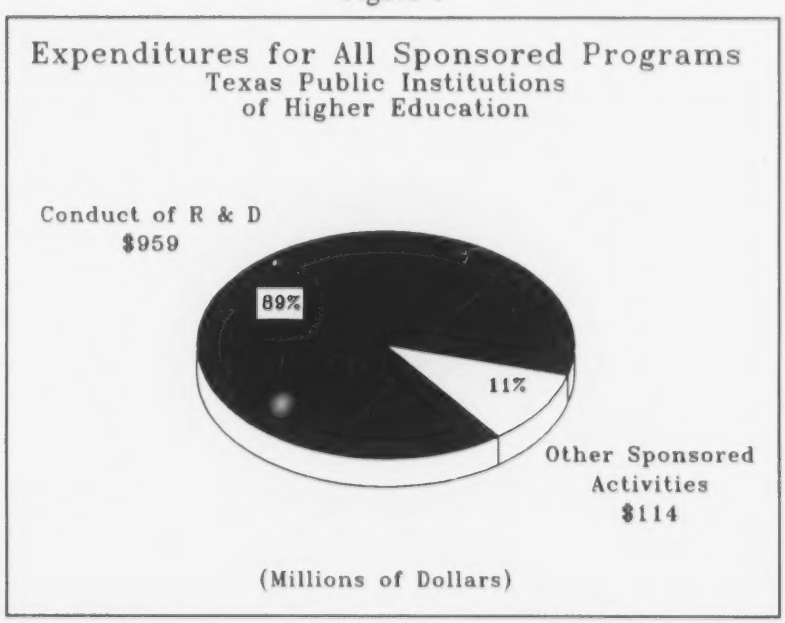

Figure 2

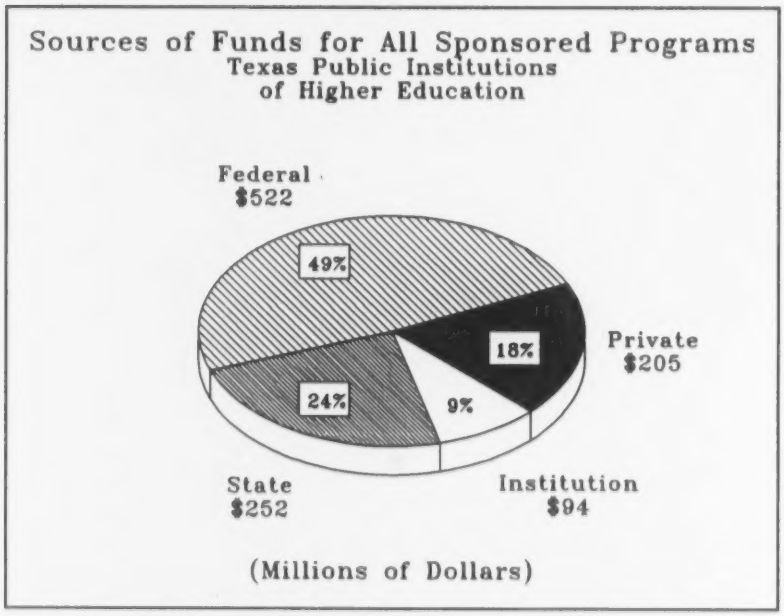

Figure 3

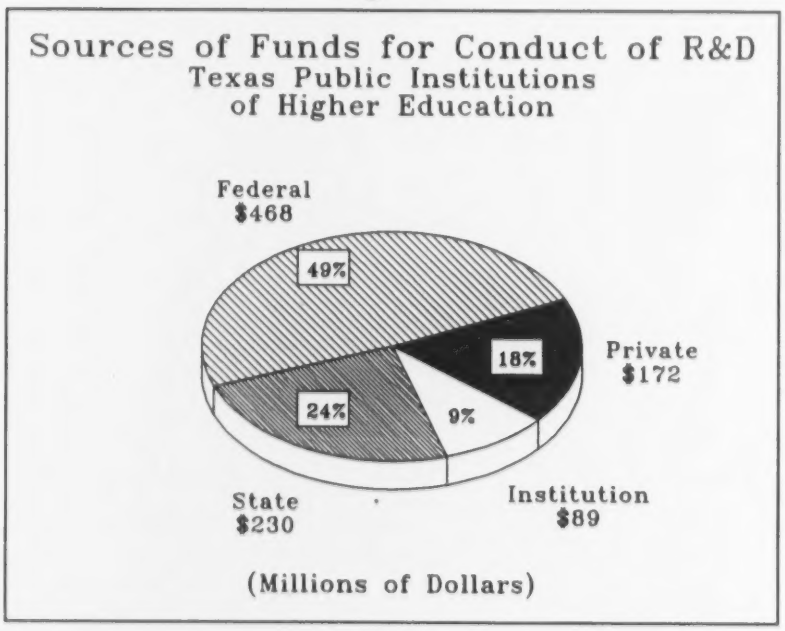

Figure 4

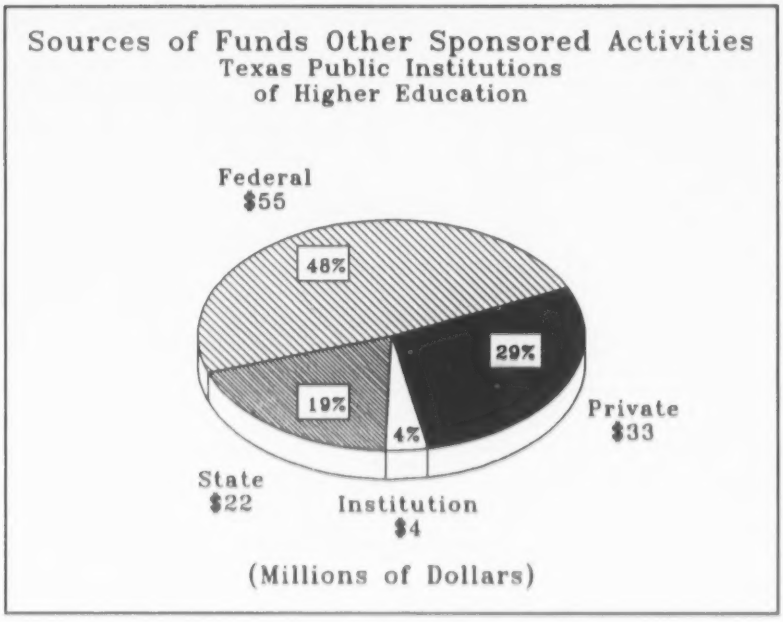

Table 4 indicates expenditures in 16 different fields defined in Appendix A. As part of their reports to the Coordinating Board, institutions were asked to assign project expenditures to only one field to avoid the possibility of double counting.

For the most part, this table accurately reflects expenditures in particular academic disciplines. Some inconsistency may result, however, as institutions strive to categorize a particular research project into only one field. For example, a college of agriculture could do basic research in biological sciences and report expenditures in that field rather than in agricultural sciences.

Table 4

Expenditures for Conduct of R&D by Field and Source of Funding Texas Public Institutions of Higher Education					
Field	Federal	State Appropriated	Institutionally Controlled	Private	Total
Medical Sciences	$159,302,980	$55,217,288	$13,657,682	$69,929,972	$298,107,922
Engineering	74,764,559	46,469,332	20,831,114	31,282,672	173,347,677
Biological and Other Life Sciences	61,551,406	55,567,380	18,156,536	13,670,000	148,945,322
Physical Sciences	66,882,813	18,552,968	6,682,696	17,405,568	109,524,045
Environmental Sciences	56,621,703	12,622,212	3,754,716	15,042,245	88,040,876
Agricultural Sciences	9,815,124	21,239,608	9,289,380	5,873,627	46,217,738
Computer Science	8,865,121	3,340,795	6,984,009	2,624,141	21,814,066
Social Sciences	5,573,995	7,267,432	1,683,681	4,881,590	19,406,698
Business Administration	4,745,831	2,428,197	928,681	4,266,613	12,369,322
Education	6,635,401	979,035	530,045	1,329,467	9,473,948
Mathematical Sciences	4,835,666	3,024,400	709,538	265,251	8,834,855
Arts and Humanities	1,460,612	1,362,575	3,340,321	1,466,480	7,629,988
Psychology	4,944,863	520,088	528,708	400,992	6,394,651
Law and Public Administration	459,289	1,144,195	1,402,043	1,641,936	4,647,463
Other Non-Science Activities	949,075	127,991	555,017	1,602,871	3,234,954
Other Sciences	296,857	89,123	346,172	229,912	962,064
Totals	$467,705,295	$229,952,618	$89,380,339	$171,913,337	$958,951,589

Table 5 shows research in 10 different areas, and double counting was allowed because institutions reported considerable difficulty in developing this information. They faced two general problems: many projects are relevant to two or more areas of research, and grant administration personnel are not always aware of a particular project's relevance to a specific area when the research funds are acquired.

Table 5

Expenditures for Conduct of R&D in Areas of Special Interest Texas Public Institutions of Higher Education *(includes double counting)					
Area of Special Interest	Federal	State Appropriated	Institutionally Controlled	Private	Total
Cancer Research	$49,676,559	$57,537,548	$11,988,826	$13,548,091	$132,751,024
Biotechnology	14,555,079	22,766,075	9,942,517	5,392,053	52,655,724
Energy	25,438,334	12,888,880	2,376,630	8,455,880	49,159,724
Food, fiber, agricultural products	9,659,441	21,511,844	7,329,904	5,068,903	43,570,091
Aerospace Technology	17,626,559	1,344,145	746,140	1,275,807	20,992,651
Environmental Science & Engineering	9,599,859	7,411,223	919,155	2,725,443	20,655,680
Materials Science & Engineering	9,034,147	7,112,848	257,599	2,729,989	19,134,583
Microelectronics & Computer Techology	5,259,920	3,619,172	992,240	3,862,092	13,733,424
AIDS Research	3,795,136	1,097,326	71,337	2,057,252	7,021,051
Manufacturing Technology	1,144,367	2,673,188	245,900	1,728,245	5,791,700
Totals	$145,789,401	$137,962,249	$34,870,248	$46,843,755	$365,465,652

Table 6 provides a rough approximation funding sources for basic research and for applied research. Many projects contain elements of both basic and applied research and are difficult to classify. Some researchers and research administrators are reluctant to say they do anything other than basic research. On the other hand, many take an exceedingly broad view and are reluctant to say they do much basic research. When reporting their data many institutions assume that some organizations such as the National Science Foundation, support only basic research, while other organizations, including private industry, support only applied research.

Definitions of basic and applied research are included in Appendix A.

Table 6

Expenditures for Conduct of R&D by Character of Work and Source
Texas Public Institutions of Higher Education

Character of Work	Federal	State Appropriated	Institutionally Controlled	Private	Total
Basic Research	$396,362,417	$159,303,274	$49,315,883	$94,707,301	$699,688,875
Applied Research & Development	71,342,878	70,649,344	40,064,456	77,206,036	259,262,714
Totals	$467,705,295	$229,952,618	$89,380,339	$171,913,337	$958,951,589

Table 7 breaks funding sources into two categories: funds received through a peer-review process and funds received through a negotiation process. The proportion of research derived from peer-reviewed processes is considered one indicator of the quality of research conducted at an institution.

In many cases, it is difficult to classify the contract and grant process. Contracts may be awarded competitively, with follow-up contracts negotiated. In some cases, contracts are not awarded after a review process, but sponsors have faced rigorous selection processes. There are many other considerations that make absolute generalizations invalid.

Institutions used several methods to estimate the data in this table. Many allowed funding sources to determine the proper category.

Definitions for peer-review and negotiation processes are included in Appendix A.

Table 7

Expenditures for Conduct of R&D by Selection Process and Source
Texas Public Institutions of Higher Education

Selection Process	Federal	State Appropriated	Institutionally Controlled	Private	Total
Competitive, Peer Review	$429,078,074	$65,379,693	$21,463,363	$82,489,983	$598,411,114
Negotiated or Other	38,627,221	164,572,924	67,916,976	89,423,354	360,540,476
Totals	$467,705,295	$229,952,618	$89,380,339	$171,913,337	$958,951,589

Institutional Data

This section of the report contains detailed information on research expenditures at individual institutions. Statements related to data quality and applicability found in the previous section of the report also apply to data shown in this section of the report.

Figure 5

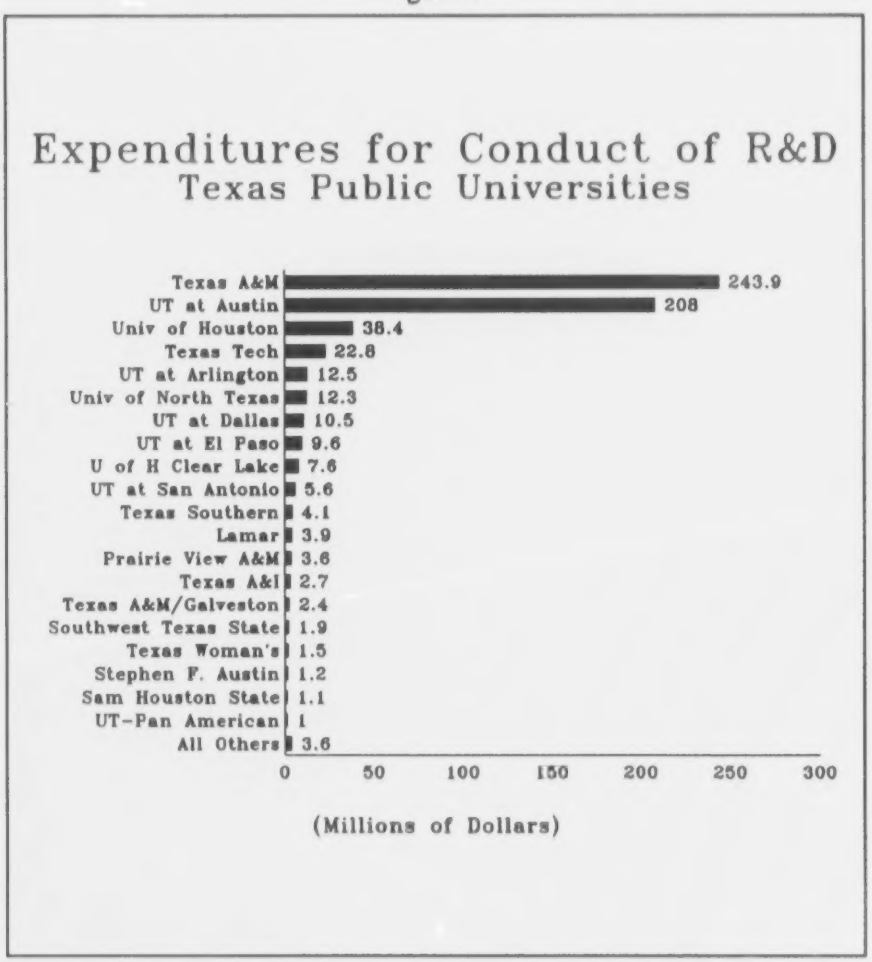

Figure 6

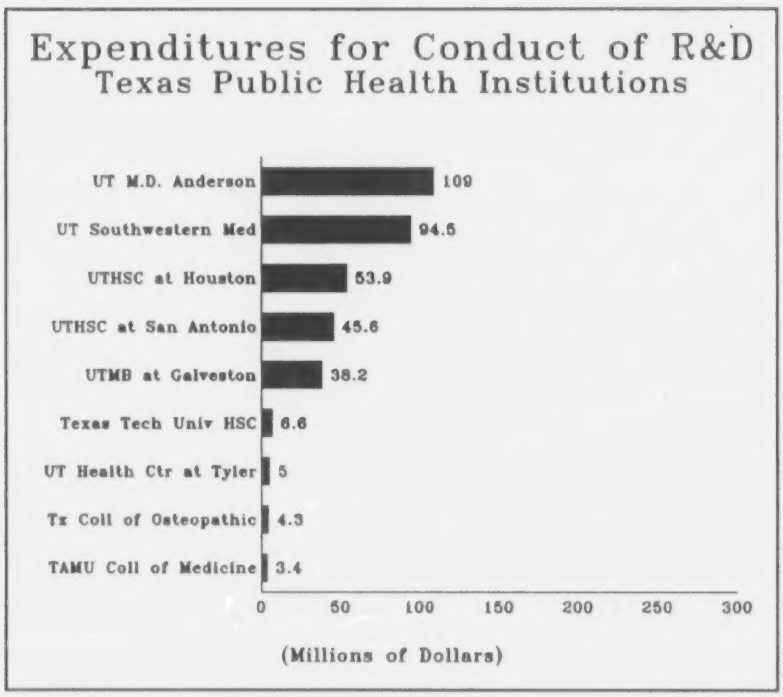
Expenditures for Conduct of R&D
Texas Public Health Institutions
UT M.D. Anderson
109
UT Southwestern Med
94.5
UTHSC at Houston
53.9
UTHSC at San Antonio
45.6
UTMB at Galveston
38.2
Texas Tech Univ HSC
6.6
UT Health Ctr at Tyler
5
Tx Coll of Osteopathic
4.3
TAMU Coll of Medicine
3.4
0
50
100
150
200
250
300
(Millions of Dollars)

Table 8

Total Expenditures for Sponsored Programs by Source of Funds
Texas Public Institutions of Higher Education

	Federal		State Appropriated		Institutionally Controlled	
	R&D	Other	R&D	Other	R&D	Other
East Texas State	$ 103,226	$ 4,229,673	$ 68,470	$ 19,203	$ 0	$ 0
East Texas Texarkana	0	0	0	3,748	0	0
Lamar	2,915,121	466,713	869,830	7,217	0	0
Midwestern State	4,704	0	5,515	0	0	0
Stephen F. Austin	281,804	0	416,017	0	232,668	0
Texas A&M Univ System					0	
Corpus Christi State	104,648		202,315	75,025	32,022	0
Laredo State	0	0	72,084	0	0	0
Prairie View A & M	3,372,659	2,477,936	168,929	173,199	0	0
Tarleton State	369,918	0	265,863	0	0	0
Texas A&I	663,876	153,599	934,077	3,013	0	0
Texas A&M	90,907,160	4,495,000	79,062,721	473,000	41,531,029	0
Texas A&M/Galveston	893,599	0	1,200,052	0	127,232	0
West Texas State	2,781	8,291	147,441	4,954	167,152	129,430
Texas Southern	4,031,895	0	0	0	0	0
Texas State Univ System						
Angelo State	14,861	0	245,742	0	14,734	0
Sam Houston State	229,471	0	509,496	0	166,080	0
Southwest Texas State	900,636	4,096,972	471,413	1,699,263	114,601	0
Sul Ross State	71,255	0	66,300	0	0	0
Texas Tech	7,467,666	1,540,582	9,129,955	46,997	1,072,315	0
Texas Woman's	466,206	0	709,196	0	0	0
The Univ of Texas System						
UT at Arlington	3,006,061	0	6,022,000	0	370,668	0
UT at Austin	116,493,961	0	28,418,725	0	22,191,189	0
UT at Brownsville	0	0	14,042	0	0	0
UT at Dallas	4,986,036	0	1,548,178	0	1,331,925	0
UT at El Paso	7,116,165	10,656,885	1,581,350	98,804	181,198	0
UT-Pan American	839,032	0	55,108	0	3,746	0
UT-Permian Basin	95,162	0	115,871	0	18	0
UT at San Antonio	3,775,018	1,738,685	1,098,886	625,090	367,937	0
UT at Tyler	4,214	0	129,057	0	183,223	0
Univ of Houston System						
Univ of Houston	21,855,155	5,196,179	10,922,633	2,174,423	803,544	0
U of H - Clear Lake	7,407,743	857,443	6,450	77,451	0	0
U of H - Downtown	102,413	0	111,414	0	0	0
U of H - Victoria	20,000	0	30,096	0	0	0
Univ of North Texas	2,188,630	2,596,416	4,106,774	567,964	2,120,788	558,239
Subtotals	$ 280,691,076	$ 38,514,374	$ 148,706,000	$ 6,049,351	$ 71,012,069	$ 687,669
TAMU Coll of Medicine	$ 2,557,054	$ 0	$ 165,560	$ 0	$ 89,818	$ 0
Tx Coll of Osteopathic Med	3,134,973	0	68,627	0	0	0
Texas Tech Univ HSC	3,172,062	0	1,565,137	0	571,091	0
UT M.D. Anderson Cancer	32,314,353	0	55,933,373	0	11,440,589	3,718,243
UTMB at Galveston	20,973,514	2,984,257	5,840,938	0	2,629,832	
UTHSC at Houston	32,777,850	0	6,547,371	0	1,253,144	0
UT Health Ctr at Tyler	1,567,985	0	1,694,991	0	1,259,544	0
UTHSC at San Antonio	32,770,341	6,260,281	3,147,641	7,430,970	12,871	
UT Southwestern Med Ctr	57,746,087	7,032,188	6,282,980	8,625,305	1,111,381	0
Subtotals	$ 187,014,219	$ 16,276,726	$ 81,246,618	$ 16,056,275	$ 18,368,270	$ 3,718,243
Totals	$ 467,705,295	$ 54,791,100	$ 229,952,618	$ 22,105,626	$ 89,380,339	$ 4,405,912

Table 8 - Continued

Total Expenditures for Sponsored Programs by Source of Funds
Texas Public Institutions of Higher Education

	Private		Total		
	R&D	Other	R&D	Other	Total
East Texas State	$ 157,648	$ 1,088,916	$ 329,344	$ 5,337,792	$ 5,667,136
East Texas State/Texarkana	0	0	0	3,748	3,748
Lamar	128,712	82,084	3,913,663	556,014	4,469,677
Midwestern State	62,922	0	73,141	0	73,141
Stephen F. Austin State	315,823	0	1,246,312	0	1,246,312
Texas A&M Univ System					
Corpus Christi State	395,857	25,734	734,842	100,759	835,601
Laredo State	0	0	72,084	0	72,084
Prairie View A & M	81,417	49,405	3,623,005	2,700,540	6,323,545
Tarleton State	35,885	0	671,666	0	671,666
Texas A&I	1,079,337	287	2,677,290	156,899	2,834,189
Texas A&M	32,365,352	900,000	243,866,262	5,868,000	249,734,262
Texas A&M/Galveston	197,503	0	2,418,386	0	2,418,386
West Texas State	36,048	61,699	353,422	204,374	557,796
Texas Southern	81,230	0	4,113,125	0	4,113,125
Texas State Univ System					
Angelo State	30,529	0	305,866	0	305,866
Sam Houston State	224,592	0	1,129,639	0	1,129,639
Southwest Texas State	436,308	1,674,827	1,922,958	7,471,062	9,394,020
Sul Ross State	22,882	0	160,437	0	160,437
Texas Tech	5,113,633	4,666,797	22,783,569	6,254,376	29,037,945
Texas Woman's	302,565	0	1,477,967	0	1,477,967
The Univ of Texas System					
UT at Arlington	3,134,014	0	12,532,743	0	12,532,743
UT at Austin	40,929,618	0	208,033,493	0	208,033,493
UT at Brownsville	4,987	0	19,029	0	19,029
UT at Dallas	2,655,116	0	10,521,255	0	10,521,255
UT at El Paso	743,863	4,061,143	9,622,576	14,816,832	24,439,408
UT-Pan American	97,933	0	995,819	0	995,819
UT-Permian Basin	101,314	0	312,365	0	312,365
UT at San Antonio	356,871	233,356	5,598,712	2,597,131	8,195,843
UT at Tyler	13,754	0	330,248	0	330,248
Univ of Houston System					
Univ of Houston	4,863,168	2,233,115	38,444,500	9,603,717	48,048,217
U of H - Clear Lake	183,025	128,980	7,597,218	1,063,874	8,661,092
U of H - Downtown	0	0	213,827	0	213,827
U of H - Victoria	0	0	50,096	0	50,096
Univ of North Texas	3,877,158	3,544,608	12,293,350	7,267,227	19,560,577
Subtotals	$ 98,029,064	$ 18,750,951	$ 598,438,209	$ 64,002,345	$ 662,440,554
TAMU Coll of Medicine	$ 604,237	$ 0	$ 3,416,669	$ 0	$ 3,416,669
Tx Coll of Osteopathic Med	1,110,477	0	4,314,077	0	4,314,077
Texas Tech Univ HSC	1,255,716	0	6,564,006	0	6,564,006
UT M.D. Anderson Cancer	9,300,400	0	108,988,715	3,718,243	112,706,958
UTMB at Galveston	8,745,802	0	38,190,086	2,984,257	41,174,343
UTHSC at Houston	13,318,063	0	53,896,428	0	53,896,428
UT Health Ctr at Tyler	499,860	0	5,022,380	0	5,022,380
UTHSC at San Antonio	9,684,303	2,814,242	45,615,156	16,505,493	62,120,649
UT Southwestern Med Ctr	29,365,415	11,315,546	94,505,863	26,973,039	121,478,902
Subtotals	$ 73,884,273	$ 14,129,788	$ 360,513,380	$ 50,181,032	$ 410,694,412
Totals	$ 171,913,337	$ 32,880,739	$ 958,951,589	$ 114,183,377	$ 1,073,134,966

Table 9

Expenditures for Conduct of R&D by Field
Texas Public Institutions of Higher Education

	Engineering	Physical Sciences	Environmental Sciences	Mathematical Sciences	Computer Science	Medical Sciences	Agricultural Sciences	Biological and Other Life Sci
East Texas State	$ 0	$ 207,437	$ 0	$ 344	$ 0	$ 0	$ 40,089	$ 713
East Texas State/Texarkana	0	0	0	0	0	0	0	0
Lamar	2,137,232	225,746	164,279	86,453	77,061	0	0	29,267
Midwestern State	0	27,027	0	0	0	0	0	10,219
Stephen F. Austin State	0	188,809	8,940	11,964	11,804	29,006	859,616	10,000
Texas A&M Univ System								
Corpus Christi State	0	613,278	75,246	0	0	0	0	10,058
Laredo State	0	0	0	0	0	0	0	0
Prairie View A & M	156,951	605,039	4,259	0	0	0	2,526,601	219,155
Tarleton State	0	89,978	551,850	0	0	0	12,616	139
Texas A&I	171,915	79,465	9,890	0	530	0	2,124,744	286,774
Texas A&M	62,170,784	17,280,030	54,655,239	1,209,814	4,483,127	1,595,020	33,686,702	56,765,686
Texas A&M/Galveston	52,601	115,732	1,847,640	0	0	0	1,551	381,005
West Texas State	353,422	0	0	0	0	0	0	0
Texas Southern	0	1,918,799	0	112,810	3,000	0	0	1,651,081
Texas State Univ System								
Angelo State	0	24,891	16,423	0	0	0	219,655	33,488
Sam Houston State	0	274,039	6,326	84,387	54,008	0	51,235	44,694
Southwest Texas State	0	310,878	0	42,470	84,631	71,886	15,252	863,657
Sul Ross State	0	0	15,883	0	0	0	19,413	120,946
Texas Tech	6,857,368	2,897,780	552,890	213,107	204,180	14,192	6,602,264	1,161,289
Texas Woman's	0	45,445	0	10,854	0	303,985	0	985,986
The Univ of Texas System								
UT at Arlington	7,864,736	2,136,866	685,170	119,546	508,509	356,865	0	377,969
UT at Austin	74,843,263	48,046,837	24,838,724	1,595,200	11,965,816	4,020,625	0	12,734,144
UT at Brownsville	0	0	0	0	0	0	0	0
UT at Dallas	609,040	5,158,294	1,295,069	52,849	197,260	522,468	0	1,289,844
UT at El Paso	3,921,831	1,379,966	545,693	194,578	426,962	5,864	0	1,487,810
UT-Pan American	0	34,438	13,723	80,468	0	436,807	0	167,716
UT-Permian Basin	37,703	24,965	0	0	0	0	0	0
UT at San Antonio	521,101	294,235	0	190,371	95,624	0	0	1,807,313
UT at Tyler	0	0	0	0	15,894	4,372	0	9,215
Univ of Houston System								
Univ of Houston	8,757,694	20,545,382	819,612	584,441	189,315	2,965,925	0	896,323
U of H - Clear Lake	4,639,759	31,067	14,875	334,838	1,405,360	0	0	177,744
U of H - Downtown	0	15,849	0	1,435	159,420	0	0	0
U of H - Victoria	0	0	0	42,007	83	0	0	0
Univ of North Texas	252,277	2,768,721	1,919,145	1,383,523	1,929,082	178,181	0	1,593,517
Subtotals	$ 173,347,677	$ 105,340,993	$ 88,040,876	$ 6,351,459	$ 21,811,666	$ 10,505,196	$ 46,159,738	$ 83,115,752
TAMU Coll of Medicine	$ 0	$ 0	$ 0	$ 0	$ 0	$ 1,733,669	$ 58,000	$ 1,464,000
Texas Tech Univ HSC	0	0	0	0	0	4,140,457	0	2,423,549
Tx Coll of Osteopathic Med	0	0	0	0	0	3,975,613	0	145,228
UT Health Ctr at Tyler	0	0	0	0	2,400	5,019,980	0	0
UT M.D. Anderson Cancer	0	4,183,052	0	2,483,396	0	57,861,319	0	44,460,948
UT Southwestern Med Ctr	0	0	0	0	0	94,156,279	0	349,584
UTHSC at Houston	0	0	0	0	0	36,910,167	0	16,986,261
UTHSC at San Antonio	0	0	0	0	0	45,615,156	0	0
UTMB at Galveston	0	0	0	0	0	38,190,086	0	0
Subtotals	$ 0	$ 4,183,052	$ 0	$ 2,483,396	$ 2,400	$ 287,602,726	$ 58,000	$ 65,829,570
Totals	$ 173,347,677	$ 109,524,045	$ 88,040,876	$ 8,834,855	$ 21,814,066	$ 298,107,922	$ 46,217,738	$ 148,945,322

Table 9 - Continued

Expenditures for Conduct of R&D by Field
Texas Public Institutions of Higher Education

	Social Sciences	Other Sciences	Arts and Humanities	Business Administration	Education	Law and Public Administration	Other Non-Science	Total
East Texas State	$ 2,303	$ 0	$ 14,640	$ 8,429	$ 54,389	$ 0	$ 0	$ 329,344
East Texas State/Texarkana	0	0	0	0	0	0	0	0
Lamar	12,552	0	28,671	1,123,602	0	0	0	3,913,663
Midwestern State	22,413	0	0	0	13,482	0	0	73,141
Stephen F. Austin State	1,158	0	41,307	37,249	26,959	750	0	1,246,312
Texas A&M Univ System								
Corpus Christi State	4,315	0	29,914	2,031	0	0	0	734,842
Laredo State	11,394	0	0	52,732	7,958	0	0	72,084
Prairie View A & M	111,000	0	0	0	0	0	0	3,623,005
Tarleton State	0	1,422	10,646	0	0	0	0	671,666
Texas A&I	0	0	0	0	0	0	3,972	2,677,290
Texas A&M	7,261,278	0	1,414,607	1,891,191	755,732	167,959	0	243,866,262
Texas A&M/Galveston	0	0	19,857	0	0	0	0	2,418,386
West Texas State	0	0	0	0	0	0	0	353,422
Texas Southern	47,230	284,650	0	0	95,555	0	0	4,113,125
Texas State Univ System								
Angelo State	0	0	0	8,739	0	0	0	305,866
Sam Houston State	554,465	0	22,276	11,989	0	0	0	1,129,639
Southwest Texas State	15,407	15,388	89,784	11,033	17,124	72,932	0	1,922,958
Sul Ross State	0	0	0	0	4,195	0	0	160,437
Texas Tech	2,022,093	82,859	126,808	1,525,375	466,043	21,053	0	22,783,569
Texas Woman's	24,025	0	1,834	697	99,161	0	0	1,477,967
The Univ of Texas System								
UT at Arlington	116,287	0	170,210	93,103	0	11,361	0	12,532,743
UT at Austin	5,484,457	568,417	4,680,186	4,084,830	5,698,731	4,154,734	3,211,841	208,033,493
UT at Brownsville	19,029	0	0	0	0	0	0	19,029
UT at Dallas	584,240	0	99,790	441,370	55,653	0	0	10,521,255
UT at El Paso	1,025,755	0	14,294	149,213	11,687	0	0	9,622,576
UT-Pan American	123,755	0	537	60,158	20,942	2,060	0	995,819
UT-Permian Basin	0	0	25,878	221,791	0	0	0	312,365
UT at San Antonio	556,055	0	41,446	2,079,463	13,104	0	0	5,598,712
UT at Tyler	9,944	0	2,349	10,727	88,608	0	0	330,248
Univ of Houston System								
Univ of Houston	668,110	9,328	268,460	10,498	802,385	65,051	19,141	38,444,500
U of H - Clear Lake	142,747	0	17,695	0	809,707	0	0	7,597,218
U of H - Downtown	2,136	0	3,732	4,818	0	26,437	0	213,827
U of H - Victoria	0	0	6,159	333	910	0	0	50,096
Univ of North Texas	584,550	0	498,908	539,951	238,387	125,126	0	12,293,350
Subtotals	$ 19,406,698	$ 962,064	$ 7,629,988	$ 12,369,322	$ 9,280,712	$ 4,647,463	$ 3,234,954	$ 598,438,209
TAMU Coll of Medicine	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 3,416,669
Texas Tech Univ HSC	0	0	0	0	0	0	0	6,564,006
Tx Coll of Osteopathic Med	0	0	0	0	193,236	0	0	4,314,077
UT Health Ctr at Tyler	0	0	0	0	0	0	0	5,022,380
UT M.D. Anderson Cancer	0	0	0	0	0	0	0	108,988,715
UT Southwestern Med Ctr	0	0	0	0	0	0	0	94,505,863
UTHSC at Houston	0	0	0	0	0	0	0	53,896,428
UTHSC at San Antonio	0	0	0	0	0	0	0	45,615,156
UTMB at Galveston	0	0	0	0	0	0	0	38,190,086
Subtotals	$ 0	$ 0	$ 0	$ 0	$ 193,236	$ 0	$ 0	$ 360,513,380
Totals	$ 19,406,698	$ 962,064	$ 7,629,988	$ 12,369,322	$ 9,473,948	$ 4,647,463	$ 3,234,954	$ 958,951,589

Table 10

Expenditures for Conduct of R&D by Area of Special Interest
Texas Public Institutions of Higher Education

	Energy	Food, Fiber, Agricultural Pro	Cancer Research	AIDS Research	Biotechnology	Materials Science & Engineering
East Texas State	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
East Texas State/Texarkana	0	0	0	0	0	0
Lamar	21,027	0	0	0	0	5,227
Midwestern State	0	0	0	0	0	0
Stephen F. Austin State	0	821,793	0	0	1,345	0
Texas A&M Univ System						
Corpus Christi State	0	0	0	0	0	0
Laredo State	0	0	0	0	0	0
Prairie View A & M	419,000	2,526,601	0	0	219,155	187,039
Tarleton State	0	0	0	0	0	0
Texas A&I	84,804	841,193	0	0	259,979	0
Texas A&M	9,072,497	30,880,919	1,157,234	480,769	43,857,644	3,642,710
Texas A&M/Galveston	0	0	0	0	0	0
West Texas State	353,422	0	0	0	0	0
Texas Southern	399,421	30,000	188,553	0	0	0
Texas State Univ System						
Angelo State	0	219,655	0	0	0	0
Sam Houston State	51,235	0	0	0	0	274,039
Southwest Texas State	0	1,282	232,826	0	0	271,379
Sul Ross State	0	19,413	0	0	0	0
Texas Tech	1,132,759	7,215,780	82,015	0	1,310,239	2,133,305
Texas Woman's	0	561,056	0	0	0	0
The Univ of Texas System						
UT at Arlington	627,962	0	695	4,710	187,679	1,309,322
UT at Austin	28,623,458	253,981	1,519,454	838,210	2,179,096	417,976
UT at Brownsville	0	0	0	0	0	0
UT at Dallas	180,684	0	0	0	1,506,838	94,428
UT at El Paso	559,047	0	0	0	0	396,262
UT-Pan American	0	0	0	0	0	0
UT-Permian Basin	33,953	0	0	0	2,028	3,750
UT at San Antonio	0	0	0	0	105,332	44,645
UT at Tyler	0	0	0	0	0	0
Univ of Houston System						
Univ of Houston	7,410,460	8,391	795,241	388,786	1,216,007	9,734,901
U of H - Clear Lake	0	59,653	6,450		86,493	0
U of H - Downtown	0	0	0	0	0	0
U of H - Victoria	0	0	0	0	0	0
Univ of North Texas	189,995	54,799	37,629	0	849,910	619,600
Subtotal	$ 49,159,724	$ 43,494,516	$ 4,020,097	$ 1,712,475	$ 51,781,745	$ 19,134,583
TAMU Coll of Medicine	$ 0	$ 75,575	$ 157,000	$ 0	$ 317,000	$ 0
Tx Coll of Osteopathic Med	0	0	206,340	0	0	0
Texas Tech Univ HSC	0	0	365,102	84,313	119,709	0
UT M.D. Anderson*Cancer	0	0	108,988,715	0	0	0
UTMB at Galveston	0	0	2,373,034	1,278,939	0	0
UTHSC at Houston	0	0	2,920,363	1,239,367	437,270	0
UT Health Ctr at Tyler	0	0	0	0	0	0
UTHSC at San Antonio	0	0	5,750,000	900,000	0	0
UT Southwestern Med Ctr	0	0	7,970,373	1,805,957	0	0
Subtotals	$ 0	$ 75,575	$ 128,730,927	$ 5,308,576	$ 873,979	$ 0
Totals	$ 49,159,724	$ 43,570,091	$ 132,751,024	$ 7,021,051	$ 52,655,724	$ 19,134,583

Table 10 - Continued

Expenditures for Conduct of R&D by Area of Special Interest
Texas Public Institutions of Higher Education

	Manufacturing Technology	Microelectronics & Computer Tech	Aerospace Technology	Environmental Sci & Engineering	Total
East Texas State	$ 47,051	$ 0	$ 0	$ 0	$ 47,051
East Texas State/Texarkana	0	0	0	0	0
Lamar	0	18,308	115,392	2,315,783	2,475,737
Midwestern State	0	0	0	0	0
Stephen F. Austin State	0	11,804	0	189,688	1,024,630
Texas A&M Univ System					
Corpus Christi State	0	0	0	75,246	75,246
Laredo State	0	0	0	0	0
Prairie View A & M	0	17,857	94	4,259	3,374,005
Tarleton State	0	0	0	548,079	548,079
Texas A&I	0	0	0	0	1,185,976
Texas A&M	499,183	4,545,644	4,752,782	5,400,102	104,289,484
Texas A&M/Galveston	0	0	0	1,900,241	1,900,241
West Texas State	0	0	0	0	353,422
Texas Southern	0	3,000	0	420,000	1,040,974
Texas State Univ System					
Angelo State	0	0	0	16,423	236,078
Sam Houston State	0	54,008	0	6,326	385,608
Southwest Texas State	0	84,631	0	0	590,118
Sul Ross State	0	0	0	15,883	35,296
Texas Tech	1,093,756	1,423,492	514,069	2,936,028	17,841,443
Texas Woman's	0	0	0	0	561,056
The Univ of Texas System					
UT at Arlington	3,086,394	892,684	1,058,971	732,964	7,901,381
UT at Austin	739	2,408,151	30,612	1,883,626	38,155,303
UT at Brownsville	0	0	0	0	0
UT at Dallas	0	806,300	2,475,397	1,295,069	6,358,716
UT at El Paso	688,440	312,019	14,548	469,155	2,439,471
UT-Pan American	0	0	0	94,191	94,191
UT-Permian Basin	126,342	0	0	24,965	191,038
UT at San Antonio	28,479	95,624	0	60,378	334,458
UT at Tyler	0	15,894	0	0	15,894
Univ of Houston System					
Univ of Houston	180,692	1,221,659	6,392,085	862,648	28,210,870
U of H - Clear Lake	0	87,997	5,232,606	10,000	5,483,199
U of H - Downtown	0	95,479	62,537	0	158,016
U of H - Victoria	0	0	41,924	0	41,924
Univ of North Texas	40,624	1,638,873	45,124	955,458	4,432,012
Subtotal	$ 5,791,700	$ 13,733,424	$ 20,736,141	$ 20,216,512	$ 229,780,917
TAMU Coll of Medicine	$ 0	$ 0	$ 0	$ 189,000	$ 738,575
Tx Coll of Osteopathic Med	0	0	0	0	206,340
Texas Tech Univ HSC	0	0	0	0	569,124
UT M.D. Anderson Cancer	0	0	0	0	108,988,715
UTMB at Galveston	0	0	231,510	250,168	4,133,651
UTHSC at Houston	0	0	0	0	4,597,000
UT Health Ctr at Tyler	0	0	0	0	0
UTHSC at San Antonio	0	0	25,000	0	6,675,000
UT Southwestern Med Ctr	0	0	0	0	9,776,330
Subtotals	$ 0	$ 0	$ 256,510	$ 439,168	$ 135,684,735
Totals	$ 11,583,400	$ 27,466,848	$ 41,728,792	$ 40,872,192	$ 595,246,570

Table 11

Expenditures for Conduct of R&D by Character of Work Texas Public Institutions of Higher Education			
	Basic	Applied R & D	Total
East Texas State	$ 22,335	$ 307,009	$ 329,344
East Texas State/Texarkana	0	0	0
Lamar	7,119	3,906,544	3,913,663
Midwestern State	4,704	68,437	73,141
Stephen F. Austin State	113,108	1,133,204	1,246,312
Texas A&M Univ System			
Corpus Christi State	29,914	704,928	734,842
Laredo State	72,084	0	72,084
Prairie View A & M	3,384,303	238,702	3,623,005
Tarleton State	114,360	557,306	671,666
Texas A&I	873,022	1,804,268	2,677,290
Texas A&M	161,886,272	81,979,990	243,866,262
Texas A&M/Galveston	731,823	1,686,563	2,418,386
West Texas State	0	353,422	353,422
Texas Southern	2,796,501	1,316,624	4,113,125
Texas State Univ System			
Angelo State	62,910	242,956	305,866
Sam Houston State	535,801	593,838	1,129,639
Southwest Texas State	0	1,922,958	1,922,958
Sul Ross State	160,437	0	160,437
Texas Tech	14,452,571	8,330,998	22,783,569
Texas Woman's	960,117	517,850	1,477,967
The Univ of Texas System			
UT at Arlington	6,819,918	5,712,825	12,532,743
UT at Austin	190,024,461	18,009,032	208,033,493
UT at Brownsville	0	19,029	19,029
UT at Dallas	9,339,402	1,181,853	10,521,255
UT at El Paso	5,626,689	3,995,887	9,622,576
UT-Pan American	0	995,819	995,819
UT-Permian Basin	80,424	231,941	312,365
UT at San Antonio	5,499,291	99,421	5,598,712
UT at Tyler	325,876	4,372	330,248
Univ of Houston System			
Univ of Houston	34,334,053	4,110,447	38,444,500
Univ of Houston-Clear Lake	1,500,346	6,096,872	7,597,218
Univ of Houston-Downtown	13,561	200,266	213,827
Univ of Houston-Victoria	0	50,096	50,096
Univ of North Texas	7,637,191	4,656,159	12,293,350
Subtotals	$ 447,408,593	$ 151,029,616	$ 598,438,209
TAMU Coll of Medicine	$ 3,199,666	$ 217,003	$ 3,416,669
Tx Coll of Osteopathic Med	3,490,682	823,395	4,314,077
Texas Tech Univ HSC	5,471,012	1,092,994	6,564,006
UT M.D. Anderson Cancer	58,158,478	50,830,237	108,988,715
UTMB at Galveston	28,353,580	9,836,506	38,190,086
UTHSC at Houston	11,668,036	42,228,392	53,896,428
UT Health Ctr at Tyler	4,582,954	439,426	5,022,380
UTHSC at San Antonio	45,615,156	0	45,615,156
UT Southwestern Med Ctr	91,740,718	2,765,145	94,505,863
Subtotals	$ 252,280,282	$ 108,233,098	$ 360,513,380
Totals	$ 699,688,875	$ 259,262,714	$ 958,951,589

Table 12

Expenditures for Conduct of R&D by Selection Process Texas Public Institutions of Higher Education			
	Peer Review	Negotiated	Total
East Texas State	$ 279,994	$ 49,350	$ 329,344
East Texas State/Texarkana	0	0	0
Lamar	2,748,048	1,165,615	3,913,663
Midwestern State	0	73,141	73,141
Stephen F. Austin State	271,644	974,668	1,246,312
Texas A&M Univ System			
Corpus Christi State	85,304	649,538	734,842
Laredo State	0	72,084	72,084
Prairie View A & M	3,384,303	238,702	3,623,005
Tarleton State	75,111	596,555	671,666
Texas A&I	904,047	1,773,243	2,677,290
Texas A&M	110,684,208	133,182,054	243,866,262
Texas A&M/Galveston	2,092,820	325,566	2,418,386
West Texas State	54,552	298,870	353,422
Texas Southern	4,031,895	81,230	4,113,125
Texas State Univ System			
Angelo State	44,284	261,583	305,866
Sam Houston State	282,915	846,724	1,129,639
Southwest Texas State	1,922,958	0	1,922,958
Sul Ross State	71,255	89,182	160,437
Texas Tech	7,098,915	15,684,654	22,783,569
Texas Woman's	747,177	730,790	1,477,967
The Univ of Texas System			
UT at Arlington	8,806,833	3,725,910	12,532,743
UT at Austin	171,909,493	36,124,000	208,033,493
UT at Brownsville	19,029	0	19,029
UT at Dallas	8,035,516	2,485,739	10,521,255
UT at El Paso	5,209,147	4,413,429	9,622,576
UT-Pan American	957,485	38,334	995,819
UT-Permian Basin	128,385	183,980	312,365
UT at San Antonio	3,926,002	1,672,710	5,598,712
UT at Tyler	95,279	234,969	330,248
Univ of Houston System			
Univ of Houston	22,659,027	15,785,473	38,444,500
U of H - Clear Lake	923,303	6,673,915	7,597,218
U of H - Downtown	55,811	158,016	213,827
U of H - Victoria	8,172	41,924	50,096
Univ of North Texas	2,306,151	9,987,199	12,293,350
Subtotals	$ 359,819,063	$ 238,619,147	$ 598,438,209
TAMU Coll of Medicine	$ 3,131,996	$ 284,673	$ 3,416,669
Tx Coll of Osteopathic Med	3,716,378	597,699	4,314,077
Texas Tech Univ HSC	3,434,762	3,129,244	6,564,006
UT M.D. Anderson Cancer	35,951,637	73,037,078	108,988,715
UTMB at Galveston	28,001,040	10,189,046	38,190,086
UTHSC at Houston	38,950,071	14,946,357	53,896,428
UT Health Ctr at Tyler	1,751,580	3,270,800	5,022,380
UTHSC at San Antonio	37,613,533	8,001,623	45,615,156
UT Southwestern Med Ctr	86,041,054	8,464,809	94,505,863
Subtotals	238,592,051	121,921,329	360,513,380
Totals	$ 598,411,114	$ 360,540,476	$ 958,951,589

Eleven institutions reported receipt of income from research-related intellectual property. Table 13 shows the income received at each institution and the number of intellectual properties producing income.

Table 13

Intellectual Property Income		
Institutions	Income	No. of Intellectual Properties
Texas A&M	$ 387,676	11
Texas Tech	5,295	8
UT at Arlington	10,029	3
UT at Austin	327,974	44
Univ of Houston	59,390	12
Subtotals	$ 790,364	78
Texas Tech Univ HSC	$ 26,935	2
UT M.D. Anderson Cancer	1,309,214	21
UTMB at Galveston	55,358	5
UTHSC at Houston	49,422	3
UTHSC at San Antonio	73,000	7
UT Southwestern Med Ctr	855,000	13
Subtotals	$ 2,368,929	51
Totals	$ 3,159,293	129

Historical Data

Much of the data in this research expenditures report will not allow accurate comparisons with data contained in previous reports because many individual data items have been changed. Also, many data items are more rigorously defined from previous reports.

Total research expenditures is the statistic allowing the most accurate year-to-year comparison, however. Because a more-precise and more conservative definition of a research activity has been adopted, research expenditures for fiscal years 1990 and 1991 are probably understated relative to expenditures reported in previous years.

Figure 7

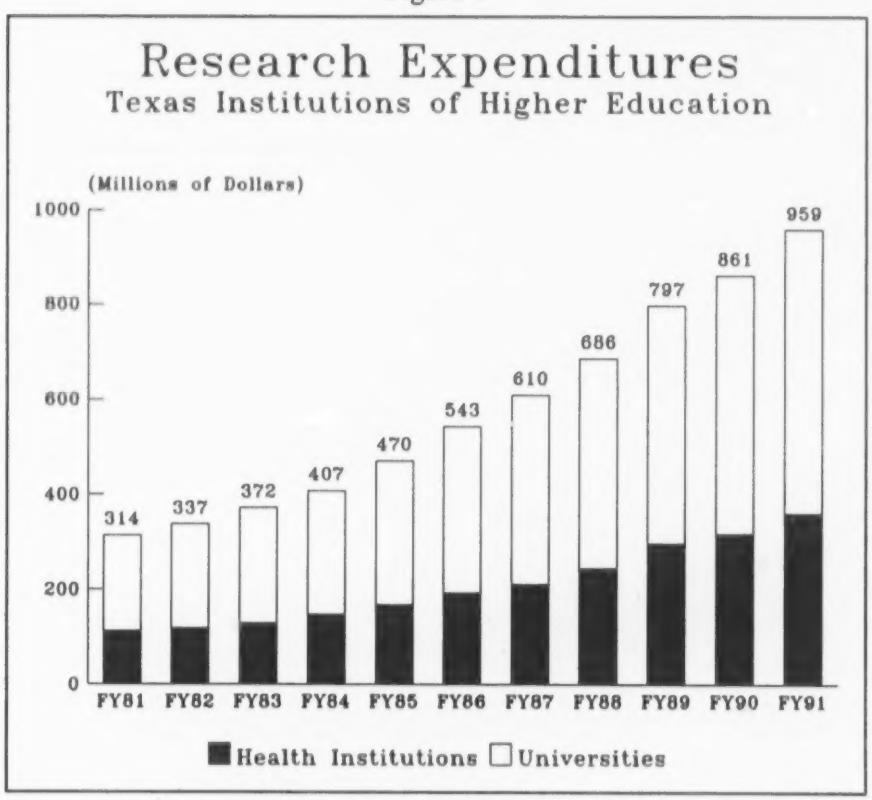

Table 13

Expenditures for Conduct of R&D Texas Public Institutions of Higher Education			
	1990	1991	Percent Change
East Texas State	$ 363,499	$ 329,344	-9.40%
East Texas State/Texarkana	0	0	0.00%
Lamar	2,839,494	3,913,663	37.83%
Midwestern State	109,824	73,141	-33.40%
Stephen F. Austin State	1,316,213	1,246,312	-5.31%
Texas A&M Univ System			
Corpus Christi State	594,051	734,842	23.70%
Laredo State	33,114	72,084	117.68%
Prairie View A & M	3,520,848	3,623,005	2.90%
Tarleton State	335,960	671,666	99.92%
Texas A&I	2,557,387	2,677,290	4.69%
Texas A&M	233,939,770	243,866,262	4.24%
Texas A&M/Galveston	1,325,970	2,418,386	82.39%
West Texas State	327,306	353,422	7.98%
Texas Southern	3,062,564	4,113,125	34.30%
Texas State Univ System			
Angelo State	438,056	305,866	-30.18%
Sam Houston State	639,240	1,129,639	76.72%
Southwest Texas State	1,304,743	1,922,958	47.38%
Sul Ross State	310,108	160,437	-48.26%
Texas Tech	22,035,019	22,783,569	3.40%
Texas Woman's	1,430,838	1,477,967	3.29%
The Univ of Texas System			
UT at Arlington	10,066,028	12,532,743	24.51%
UT at Austin	180,627,395	208,033,493	15.17%
UT at Brownsville	10,644	19,029	78.78%
UT at Dallas	11,291,731	10,521,255	-6.82%
UT at El Paso	7,435,084	9,622,576	29.42%
UT-Pan American	647,042	995,819	53.90%
UT-Permian Basin	415,935	312,365	-24.90%
UT at San Antonio	5,115,847	5,598,712	9.44%
UT at Tyler	331,637	330,248	-0.42%
Univ of Houston System			
Univ of Houston	32,663,970	38,444,500	17.70%
Univ of Houston-Clear Lake	6,605,800	7,597,218	15.01%
Univ of Houston-Downtown	198,896	213,827	7.51%
Univ of Houston-Victoria	8,670	50,096	477.81%
Univ of North Texas	11,797,626	12,293,350	4.20%
Subtotals	$ 543,700,309	$ 598,438,209	10.07%
TAMU Coll of Medicine	$ 3,129,621	$ 3,416,669	9.17%
Tx Coll of Osteopathic Med	2,767,501	4,314,077	55.88%
Texas Tech Univ HSC	6,605,591	6,564,006	-0.63%
UT M.D. Anderson Cancer	91,283,483	108,988,715	19.40%
UTMB at Galveston	36,856,413	38,190,086	3.62%
UTHSC at Houston	45,707,620	53,896,428	17.92%
UT Health Ctr at Tyler	4,557,524	5,022,380	10.20%
UTHSC at San Antonio	40,837,735	45,615,156	11.70%
UT Southwestern Med Ctr	85,918,737	94,505,863	9.99%
Subtotals	$ 317,664,225	$ 360,513,380	13.49%
Totals	$ 861,364,534	$ 958,951,589	11.33%

Acknowledgements

We would like to thank Kenneth Dalley and the Educational Data Center staff for their work in collecting this data from the institutions. Also, we would like to thank the persons who collected the data on the various campuses. Their names are in Appendix B.

Appendix A

TEXAS HIGHER EDUCATION COORDINATING BOARD

RESEARCH EXPENDITURES INSTRUCTIONS AND SURVEY for FISCAL YEAR 1991

- A new item 6 on "Intellectual Property" has been added to the last page of the report forms. Be careful not to overlook these three questions prior to returning the completed survey to the Educational Data Center by December 1, 1991.
- Your final report from last year is enclosed. The printing has been reduced so that the complete report is contained on one page.
- The Sponsored Research Officer and the Fiscal Officer should review the report for completeness prior to returning to the

Texas Higher Education Coordinating Board
Educational Data Center
P. O. Box 12788
Austin, TX 78711-2788

********** Completed form should be returned by **December 1, 1991** **********

TEXAS HIGHER EDUCATION COORDINATING BOARD

SURVEY OF RESEARCH EXPENDITURES

Fiscal Year 1991

INFORMATION SUPPLIED BY

Name _____

Title _____

Institution _____

Address _____

City _____

State Texas Zip _____

Telephone (_____) _____

Return completed form by December 1, 1991

Institution _____ FICE Code _____

SOURCES OF FUNDS (in whole dollars)

	Federal	State Sources	Inst. Controlled	Private	Total
1. TOTAL Expenditures for Sponsored Programs (distribute by Type A and B below):					
A. Total Expenditures for Conduct of R&D					
B. Expenditures for other Sponsored Activities					
2. TOTAL Expenditures for Conduct of R&D by Field (Total should equal item 1.A; distribute by field at A-P below):					
A. Engineering					
B. Physical sciences					
C. Environmental sciences					
D. Mathematical sciences					
E. Computer science					
F. Medical sciences					
G. Agricultural sciences					
H. Biological and other life sciences					
I. Psychology					
J. Social sciences					
K. Other sciences not classified above. Describe in NOTES.					
L. Arts and humanities					
M. Business administration					
N. Education					
O. Law and public administration					
P. Other non-science activities not classified in L through O, above. Describe in NOTES.					

Institution _____ FICE Code _____

SOURCES OF FUNDS (in whole dollars)

	Federal	State Sources	Inst. Controlled	Private	Total
3. Expenditures for Conduct of R&D in Areas of Special Interest:					
A. Energy					
B. Food, fiber, agricultural products					
C. Cancer Research					
D. AIDS Research					
E. Biotechnology					
F. Materials Science and Engineering					
G. Manufacturing Technology					
H. Microelectronics and Computer Technology					
I. Aerospace Technology					
J. Environmental Science and Engineering					
4. TOTAL Expenditures for Conduct of R&D by Character of Work (Total should equal item 1.A; distribute by character of work at A and B below):					
A. Basic research					
B. Applied research and development					
5. Selection Process (Total should equal item 1.A; distribute to A and B below):					
A. Funds derived from a competitive, peer-reviewed selection process					
B. Funds derived from a negotiated or other selection process					

6. Intellectual Property

a. Number of patents or copyrights obtained by the institution under terms of the institution's intellectual property policy. _____

b. Total income derived from royalties, licensing, or other transactions related to intellectual property resulting from research. (Do not include income from licensing of logos, mascots, or other items not related to research.) _____

c. Total number of different intellectual properties from which income was derived. _____

ABOUT THIS SURVEY

This is an annual survey conducted by the Texas Higher Education Coordinating Board. It is mandated by the Texas Legislature, and it is the basis for an annual report of research expenditures at Texas institutions of higher education.

The report is widely used by institutions of higher education and other state agencies, and excerpts from the report are widely reported in the press. In addition, the data provides the basis for many far-reaching policy and management decisions. It is critical that the data be reported accurately and completely.

This report should be consistent with the Annual Financial Report of the institution. Refer to College and University Business Administration, NACUBO.

The report includes only separately budgeted and accounted for expenditures and does not include research done by faculty members as a regular part of their academic duties.

The data collection form and definitions are modeled after similar forms used by the National Science Foundation in an effort to provide comparability of data with national data and to reduce the data collection efforts of the institutions.

Institutions are encouraged to submit their data in machine-readable form. A blank Lotus 1-2-3 worksheet will be provided upon request.

GENERAL CONCEPTS AND DEFINITIONS

A. **Research and Development (R&D)** activities are defined as follows:

1. **Research** is systematic study directed toward fuller scientific knowledge or understanding of the subject studies. Research is classified as either basic or applied according to the objectives of the sponsoring agency.

   In **basic research** the objective of the sponsoring agency is to gain fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications toward processes or products in mind.

   In **applied research** the objective of the sponsoring agency is to gain knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.

2. **Development** is systematic use of the knowledge or understanding gained from research, directed toward the production of useful materials, devices, systems, or methods including design and development of prototypes and processes.

Exclusions from research and development:

1. Training of scientific manpower
2. Mapping and surveys
3. Routine product testing
4. Quality control
5. Experimental production
6. Collection of general purpose statistics (statistics not collected as part of a specific R&D project)

NOTE: Certain activities may or may not be classified as research and development depending upon circumstances. Examples of such activities are given in the supplemental instructions on page 4.

B. **Selected financial terms**

1. **Fiscal Year 1991** - The 12-month accounting period ending August 31, 1991.

2. **Expenditures** - All amounts of money paid out by your institution to support R&D activities. Include funds "passed through" to other institutions of higher education. Include earned indirect costs and fringe benefits.

3. **Federal Funds** - All Federal monies used in support of the R&D activities of your institution. These include reimbursements, contracts, grants, and any identifiable amounts spent from Federal programs.

4. **State Sources** - Include all expenditures of funds appropriated by the State of Texas not included in institutionally controlled funds listed in paragraph 5 below. Included in this category are funds from the Research Enhancement Program, "Special Items," ATP and ARP funds, interagency contracts, contracts with Texas local governments, etc.

5. **Institutionally Controlled** - Include expenditures of funds which are locally controlled. This would include PUF and AUF funds, other local funds, etc.

6. **Private** - Include expenditures of funds from both for-profit and non-profit corporations and individuals. Also, include in this category funds from agencies from other states.

DEFINITIONS FOR SPECIFIC ITEMS

(Numbering corresponds to line number on data collection form)

1.A. **Expenditures for conduct of R&D** - All expenditures except those for R&D plant.

1.B. **Other sponsored activities** includes other externally-funded activities which cannot be classified as research using the definitions appearing in A, above. Examples might include technical training programs, sponsored data collection efforts, R&D plant expenditures not properly included in A, etc. Do not include projects funded with "development" funds unless they are related to research activities.

2.A. **Engineering** is concerned with studies directed toward developing engineering principles or toward making specific principles useable in engineering practice. Engineering fields include aeronautical, astronautical, chemical, civil, electrical, mechanical, metallurgy and materials, and engineering not elsewhere classified, such as agricultural, bioengineering, biomedical, industrial, nuclear, ocean, and systems.

2.B. **Physical sciences** are concerned with the understanding of the material universe and its phenomena. They comprise the fields of astronomy, chemistry, physics, and physical sciences not elsewhere classified.

2.C. **Environmental sciences** (terrestrial and extraterrestrial) are concerned with the gross, nonbiological properties (with one exception) of the areas of the solar system that directly or indirectly affect man's survival and welfare. They comprise the fields of atmospheric sciences, geological sciences, and oceanography. The one exception is that expenditures for studies pertaining to life in the sea or other bodies of water are to be reported as support of oceanography and not biology.

2.D. **Mathematical sciences** employ logical reasoning with the aid of symbols and are concerned with the development of methods of operation employing such symbols.

2.E. **Computer science** is concerned with the application of mathematical methods to automated information systems, the development of computer technology, and advanced applications of computers.

2.F. **Medical sciences** are concerned with the causes, effects, prevention, or control of abnormal conditions in man or his environment as they relate to health. Included are the clinical medical sciences, which are concerned with the study of the origins, diagnosis, or treatment of a particular disease in living human subjects under controlled conditions, and other medical sciences. Examples of the medical sciences are as follows: internal medicine, neurology; ophthalmology; preventive medicine and public health; psychiatry; radiology; surgery; veterinary medicine; dentistry; physical medicine and rehabilitation; podiatry.

2.G. **Agricultural sciences** deal with the production of food and fiber. They include work in plant sciences, animal sciences, acquaculture, agricultural economics, and other topics related to the agricultural enterprise.

2.H. **Biological sciences** are those life sciences (apart from medical sciences and agricultural sciences described above) which deal with the origin, development, structure, function, and interaction of living things. Examples of biological sciences are as follows: anatomy; animal sciences; bacteriology; biochemistry; biogeography; biophysics; ecology; embryology; entomology; evolutionary biology; genetics; immunology; microbiology; nutrition and metabolism; parasitology; pathology; pharmacology; physical anthropology; physiology; plant sciences; radiobiology; systematics.

2.I. **Psychology** deals with behavior, mental processes, and individual and group characteristics and abilities. Examples of disciplines within psychology are as follows: experimental psychology; animal behavior; clinical psychology; comparative psychology; ethnology; social psychology; educational, personnel, vocational psychology and testing; industrial and engineering psychology; development and personality.

2.J. **Social sciences** are directed toward an understanding of the behavior of social institutions and groups and of individuals as members of a

group. These include anthropology, economics, history, linguistics, political sciences, and sociology.

2.K. **Other sciences not elsewhere classified** is a category to be used for multidisciplinary and interdisciplinary projects and cannot be classified within one of the broad fields of science listed above.

2.L. **Arts and humanities** includes topics such as art, music, history, languages, religion, and other aspects of man's culture and heritage.

2.M. **Business administration** deals with the management and operation of business enterprises. It includes work in management, marketing, accounting, and related topics.

2.N. **Education** includes research related to any aspect of education. This includes elementary, secondary, and higher education; educational policy; education administration; etc.

2.O. **Law and public administration** includes research related to legal systems and to public policy at the federal, state, or local levels.

2.P. **Other non-science activities** should include all non-science disciplines not appropriately categorized above.

3. **Areas of Special Interest**

This section is intended to provide information on expenditures in areas of special interest to the public. The list is not all-inclusive. The sum of the totals in columns 3.A. through 3.J. will not normally be equal to 1.A. Further, expenditures may overlap two or more categories (e.g., a given project may be reported both as materials science and microelectronics). Institutions may need to use ad hoc estimators to come up with these numbers.

4. **Character of Work**

Using the definitions provided in "General Concepts and Definitions," above, institutions may wish to estimate the amount of basic research vs. applied R&D by assuming that funds from some sources are expended for basic research while other sources support applied research. For example, on a given campus it might be appropriate to assume federal funds support basic research, funds from for-profit private institutions support applied research, etc.

5.A. **Peer-reviewed selection processes** are processes which involve critical reviews by technically qualified persons from outside the agency making the award. For example, most grants and contracts from NSF, NIH and similar agencies would be included. Grants from the Texas Advanced Research and Advanced Technology programs would be included. Institutions may wish to estimate the quantity of peer-reviewed research using proxies similar to those described in 4, above.

5.B. **Negotiated or other awards** are awards made on the basis of some process other than peer review. These would include all grants and contracts made on the basis of a decision made internal to the agency making the award. "Special items" appropriated by the Texas legislature would be included in this category. Similarly, research grants made by industrial concerns and contracts awarded for a specific development task are typically awarded in this fashion.

6. **Intellectual property** includes patents, copyrights, and licensing agreements.

SUPPLEMENTAL INSTRUCTIONS AND DEFINITIONS

REPORTING GUIDELINES FOR R&D VERSUS NON-R&D ACTIVITIES

1. **Economic studies** - To be classified as research, the activities under this heading should be systematic and intensive. They should not include program planning, implementation, and evaluation unless these activities are designed as a fairly rigorous research effort. For example, a study to determine the impact of proposed tax changes on State revenues, or on Statewide employment, consumption, or industrial output could be reported as economic research. But the collection of economic data on tax revenues, personal income, or industrial output would be reported as economic research only if collected as part of the research project.

2. **Evaluation** - Evaluation qualifies as research when it is part of a specific research undertaking. Evaluation conducted separately from a research project is considered research when it involves scientific method and hypothesis testing procedures with fairly rigorous standards. Evaluation activities that do not involve systematic design and testing should not be included.

3. **Demonstration** - Demonstration activities that are part of research or development (i.e., that are intended to prove or to test whether a technology or method does, in fact, work) should be included. Demonstration intended to make available information about new technologies or methods should not be included. For example, an educational demonstration on new teaching methods should be reported as an R&D activity if the demonstration is established as an experiment to produce new information, is accomplished within a definite time period, and is accompanied by a thorough evaluation. An educational demonstration to apply or exhibit new teaching methods, or a demonstration without a scheduled termination or a thorough evaluation, should not be reported as an R&D activity.

4. **Collection of statistical data** - The collection of statistics is an R&D activity only if conducted as part of a specific research or development program. For example, the regular collection and publication of statistics on the incidence of various diseases within a State by a State health department is general-purpose data collection and not research or development. The data gathering is not part of a research program and is designed for use by a range of persons, such as practicing physicians, public health officials, and school officials. If the data on incidence of diseases are gathered as part of a project on the origin and nature of particular diseases, however, or to establish generalizations on why certain individuals or groups contract certain diseases, this would be research.

5. **Satellite information** - Photographs and tapes purchased from Federal agencies (or others) sponsoring satellite operations are not considered research and development unless they are used primarily in support of a research or development program. Tapes and photographs that are stored in documentation centers or used primarily for the formulation of regulations are excluded from this survey.

6. **Technology transfer** - Technology transfer involves the adoption, and perhaps adaptation, of new techniques or products that have already been brought to a useable condition. The adoption and use of a technology is not research and development, but the adaptation of a technology to meet unique regional or local needs could involve R&D activities. For example, a new method of treating water to make it potable is developed in one State. If another State adopts the same treatment process, the adoption costs for facilities, equipment, personnel, etc., are not R&D expenditures. However, if further systematic, intensive study is required by the second State to modify the treatment process to adapt it to unique local conditions, the costs of modification and adaptation could be R&D expenditures.

Appendix B

The following list contains the institutional contacts who submitted the data for this report. For additional information regarding research activities on individual campuses, these persons should be contacted directly.

Angelo State University
Robert L. Krupala
Vice President, Fiscal Affairs
(915) 942-2017

Corpus Christi State University
Paul E. Orser, Jr.
Interim Associate V.P. for Academic Affairs
(512) 994-2333

East Texas State University
Keith D. McFarland
Dean, Graduate Studies/Research
(903) 886-5159

East Texas State University at Texarkana
Joan C. Beckham
Director, Fiscal Affairs and Financial Reporting
(903) 838-6514, ext. 239

Lamar University
Jonathan M. Logan
Supervisor, Research & Grants
(409) 880-8997

Laredo State University
Jose Garcia
Vice Pres for Finance and Administration
(512) 722-8001, ext. 300

Midwestern State University
John D. Jones
Director, Institutional Research & Planning
(817) 692-6611 Ext 4226

Prairie View A & M University
Leonard L. Campbell
Supervisory Staff Accountant
(409) 857-4208

Sam Houston State University
Billy C. Covington
Director, Faculty Research
(409) 294-3621

Southwest Texas State University
Bob Cavendish
Manager, Grants Administration
(512) 245-2102

Stephen F. Austin State University
Kris E. Rhodes
Administrative Assistant
(409) 568-3971

Sul Ross State University
Oscar P. Jimenez
Assistant Comptroller
(915) 837-8042

Tarleton State University
Mike Moser
Director, Accounting Services
(817) 968-9107

Texas A&I University
Claudia Conard
Supervisor, Grants/Loans, Fiscal Affairs
(512) 595-3087

Texas A&M University
Duwayne M. Anderson
Associate Provost for Research and Graduate Studies
(409) 845-8585

Texas A&M University at Galveston
C. S. Giam
Director, Coastal Zone Laboratory
(409) 740-4465

Texas A&M University College of Medicine
Duwayne M. Anderson
Associate Provost, Research and Graduate Studies
(409) 845-8585

Texas College of Osteopathic Medicine
Patrick T. Casey
Director, Institutional Budgets
(817) 735-2630

Texas Southern University
L.L. Clarkson
Director, Institutional Research
(713) 527-7240

Texas Tech University
Robert M. Sweazy
Vice Provost for Research
(806) 742-3884

Texas Tech University Health Sciences Center
Elmo M. Cavin
Vice-President, Fiscal Affairs
(806) 743-3080

Texas Woman's University
Elizabeth Petersen
Controller
(817) 898-3525

The University of Texas at Arlington
J. D. Wetsel
Vice President for Business Affairs
(817) 273-2102

The University of Texas at Austin
Joe A. Powell
Associate Vice President, Business Affairs
(512) 471-1422

The University of Texas at Brownsville
Abel Hinojosa
Dean, Business Affairs
(512) 982-0170

The University of Texas at Dallas
Cheryl O'Steen
Director of Budgets
(214) 690-2663

The University of Texas at El Paso
March H. Guevara
Director, Accounting Services
(915) 747-5197

The University of Texas of the Permian Basin
Carl F. Prestfeldt
Chief Business Officer
(915) 367-2111

The University of Texas-Pan American
Paula Zepeda
Grants and Contracts Coordinator
(512) 381-2711

The University of Texas at San Antonio
Carol A. Hollingsworth
Director, Grants and Contract Administration
(512) 691-4234

The University of Texas at Tyler
Ronald T. Wall
Chief Fiscal Officer
(903) 566-7107

The University of Texas Health Science Center at Houston
Laura D. Smith
Director, Financial Reporting
(713) 792-4941

The University of Texas Health Science at San Antonio
R. B. Price
Executive Vice President for Administration and Business Affairs
(512) 567-2000

The University of Texas Health Center at Tyler
Dennis P. Kilday
Associate Director, Fiscal Affairs
(903) 877-7722

The University of Texas M. D. Anderson Cancer Center at Houston
Michael J. Best
Associate Vice-President, Business Affairs
(713) 792-7550

The University of Texas Medical Branch at Galveston
Richard S. Moore
Vice President, Business Affairs
(409) 772-6454

The University of Texas Southwestern Medical Center at Dallas
Dr. Peter H. Fitzgerald
Executive Vice President for Business Affairs
(214) 688-3572

University of Houston
Julie T. Norris
Assistant Vice President & Director
(713) 749-3412

University of Houston - Clear Lake
Nancy B. Bell
Assistant Vice President, Research and Sponsored Programs
(713) 283-3015

University of Houston - Downtown
Molly Woods
Vice Pres for Academic Affairs & Provost
(713) 221-8003

University of Houston - Victoria
Daniel P. Jaeckle
Dean, Academic Affairs
(512) 576-3151, ext. 215

University of North Texas
Phillip Diebel
Vice President for Fiscal Affairs
(817) 565-3246

West Texas State University
Gary Barnes
Assoc VP & Controller
(806) 656-2080

For more information contact:

Dr. David W. Gardner
Texas Higher Education Coordinating Board
Division of Research, Planning and Finance
P.O. Box 12788
Austin, TX 78711-2788
(512) 483-6150